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Reply to Office Action of May 11, 2006

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1   1.   (currently amended)   A method for isolating failed routing resources on a
2 programmable integrated circuit, the method comprising:
3   receiving a set of failed test patterns ~~that generated erroneous results when applied~~
4 ~~to a set of failed test paths~~, wherein a test pattern includes program bits that define how routing
5 resources on the programmable integrated circuit are connected to form a test path, wherein a test
6 pattern is designated as failing when a result from a test path is erroneous, wherein the result of
7 the failed test path is created by applying one or more test values to the failed test path ~~the failed~~
8 ~~test paths connecting together routing resources on the programmable integrated circuit~~;
9   identifying a subset of the routing resources that occur most frequently in the
10 failed test paths; and
11   generating new test patterns including program bits that define new test paths for
12 testing the subset of the routing resources that occurred most frequently in the failed test paths,
13 wherein each routing resource of the subset has at least one corresponding new test path that
14 includes:
15   that routing resource; and
16   at least one other resource that was not previously coupled with that
17 routing resource in one of the failed test paths.

1   2.   (original)   The method according to claim 1 further comprising:
2   testing the new test patterns using a test system to isolate routing resources among
3 the subset of the routing resources that caused the erroneous results in the failed test patterns.

1   3.   (original)   The method according to claim 1 wherein generating the
2 new test patterns for the subset of the routing resources further comprises:

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3   generating new test patterns for new test paths that route through every

4 combination of fan-in resources and fan-out resources that are programmably connectable to

5 each of the subset of the routing resources.

1   4. (original) The method according to claim 1 wherein generating the

2 new test patterns for the subset of the routing resources further comprises:

3   generating new test patterns for test paths that route through clock and clear signal

4 routing resources.

1   5. (original) The method according to claim 1 wherein each of the failed

2 test paths and the new test paths connect a control point to an observation point on the

3 programmable integrated circuit.

1   6. (original) The method according to claim 1 wherein the routing

2 resources have more than 1000 times as many routing resources as the subset of routing

3 resources.

1   7. (original) The method according to claim 5 further comprising:

2   receiving a test log file that indicates the observation points for the failed test

3 paths.

1   8. (original) The method according to claim 1 wherein identifying the

2 subset of the routing resources that occur most frequently in the failed test paths further

3 comprises:

4   extracting the routing resources that are connected along each of the failed test

5 paths using a connectivity graph.

1   9. (currently amended) A computer program product encoded on a

2 computer readable medium for isolating failed routing resources on a programmable integrated

3 circuit, the computer readable medium comprising:

4   code for receiving a set of failed test patterns generating erroneous results when

5 <u>test values are</u> applied to a set of failed test paths ~~that connect together routing resources on the~~

6   ~~programmable integrated circuit; and,~~ wherein a test pattern includes program bits that define

7   how routing resources on the programmable integrated circuit are connected to form a test path;

8   code for identifying a subset of the routing resources that occur most frequently in

9   the failed test paths; and

10   code for generating new test patterns including program bits that define new test

11 paths for the subset of the routing resources that occurred most frequently in the failed test paths,

12 wherein each routing resource of the subset has at least one corresponding new test path that

13 includes:

14   that routing resource; and

15   at least one other resource that was not previously coupled with that

16 routing resource in one of the failed test paths.

1   10.   (original)   The computer program product of claim 9 wherein the code

2   for receiving and identifying further comprises:

3   code for receiving a test log file that indicates observation points for the failed test

4   paths.

1   11.   (original)   The computer program product of claim 9 wherein the code

2   for generating further comprises:

3   code for generating new test patterns for test paths that route through clock and

4   clear signal routing resources.

1   12.   (original)   The computer program product of claim 9 further

2   comprising:

3   code for testing the new test patterns to isolate routing resources among the subset

4   that caused the erroneous results in the failed test patterns.

1   13.   (original)   The computer program product of claim 9 wherein the code

2   for generating further comprises:

3   code for generating new test patterns that route through every combination of fan-

4   in resources and fan-out resources that are programmably connectable to each of the subset of

5   the routing resources.

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1   14.   (original)   The computer program product of claim 9 wherein the

2   routing resources have more than 10,000 times as many routing resources as the subset of the

3   routing resources.

1   15.   (currently amended)   A computer system for isolating failed routing

2   resources on a programmable integrated circuit, the computer system comprising:

3   a statistical failure isolation (SFI) tool that identifies a subset of routing resources

4   that occur most frequently in failed test paths, wherein the SFI tool receives a set of failed test

5   patterns that generated erroneous results when test values are applied to a set of ~~the~~ failed test

6   paths, wherein a test pattern includes program bits that define how routing resources on the

7   programmable integrated circuit are connected to form a test path ~~the failed test paths connecting~~

8   ~~together the routing resources on the programmable integrated circuit~~; and

9   an adaptive failure isolation (AFI) tool that generates new test patterns including

10   program bits that define new test paths for the subset of the routing resources that occurred most

11   frequently in the failed test paths, wherein each routing resource of the subset has at least one

12   corresponding new test path that includes:

13   that routing resource; and

14   at least one other resource that was not previously coupled with that

15   routing resource in one of the failed test paths.

1   16.   (original)   The computer system according to claim 15 wherein the

2   SFI tool also receives a test log file that indicates observation points for the failed test paths.

1   17.   (original)   The computer system according to claim 15 further

2   comprising:

3   a test system that tests the new test patterns to isolate routing resources among the

4   subset that caused the erroneous results in the failed test patterns.

1   18.   (original)   The computer system according to claim 15 wherein:

2   the AFI tool generates new test patterns for new test paths that route through

3   every combination of fan-in resources and fan-out resources that are programmably connectable

4   to each of the subset of the routing resources.

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1   19.   (original)   The computer system according to claim 15 wherein the

2   routing resources have more than 1000 times as many routing resources as the subset of routing

3   resources.

1   20.   (original)   The computer system according to claim 15 wherein the

2   SFI tool extracts the routing resources that are connected along each of the failed test paths using

3   a connectivity graph.

1   21.   (new)   The method of claim 1, wherein the at least one

2   corresponding new test path is used to determine whether that routing resource has failed.

1   22.   (new)   The method of claim 1, wherein the erroneous result of a

2   failed test path is an output value of the failed test path that does not equal an expected value.

1   23.   (new)   The method of claim 2, wherein the testing a new test

2   pattern tests a clock control point and comprises:

3   scanning in a first value to a failed resource;

4   scanning in a second value to a data control point coupled with the failed

5   resource;

6   scanning out the value stored in the failed resource and comparing that value to

7   the first value;

8   transmitting a clock signal from the clock control point to the failed resource; and

9   scanning out the value stored in the failed resource and comparing that value to

10   the second value.

1   24.   (new)   The method of claim 2, wherein the testing a new test

2   pattern tests a clear control point and comprises:

3   scanning in 1 into a failed resource;

4   scanning out the value stored in the failed resource and comparing that value to 1;

5   transmitting a clear signal from the clear control point to the failed resource; and

6   scanning out the value stored in the failed resource and comparing that value to 0.